International Journal of Library Science and Research (IJLSR)
ISSN(P): 2250-2351; ISSN(E): 2321-0079
Vol. 5, Issue 2, Apr 2015, 1-6

BUILDING A SUSTAINABLE DIGITAL LIBRARY

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ABSTRACT

Information leads to knowledge and knowledge leads to wisdom. Every human activity requiresknowledge to accomplish their daily task. Theformat for creation/storage of information has changed with the emergence of e-publishing. The information available in digital form should be preserved for future and for this the digital library has to be sustainable. The growth of digital libraries, rapidly changing technological and networking infrastructure threatens the sustainability of digital knowledge. This paperhighlightsdesigning of a sustainable digital library by providing methods to preserve the subscribed/purchased digital information, digitally created/converted information and library databases. The technological options to sustain the digital knowledge are discussed. “Green libraries” are the future libraries and preserving the knowledge contained by them by making the resource sustainable is the new goal of the modern libraries.

KEYWORDS: Digital Library, Institutional Repositories, Cloud Computing, Parallel Computing, Grid Computing, Maintenance Fees, Back- Up

INTRODUCTION

The development in information technology has affected drastically the way ofinformation creation, retrieval and distribution. These developments have offered libraries and information centers with a number of specialized databases, online journals, online information delivery and library services, resource sharing networks. The emergence and application of computers and information technology has made the libraries mostly dependents on computers. There are dramatic changes taking place in the library and information science system. Every corner of the library has effect of computers ranging from the information creation to dissemination. Libraries and information centers called this process of information storage, preservation and retrieval as digital libraries.

The e-information always gets attachedto the question of its sustainability. Being in the digital form, if something goes wrong with the systems, how can we get back the storedinformation was a big question. The growth of the digital libraries, rapidly changing technological and networking infrastructure threatens the sustainability of digital knowledge. New technology of computers and data communication simultaneously made library and information centers work more technical and complex than before.

DIGITAL LIBRARY: MEANING

A digital library is a collection of documents in organized electronic form, available on the Internet or on CD-ROM (compact-disk read-only memory) disks. Depending on the specific library, a user may be able to access magazine articles, books, papers, images, sound files, and videos along with means for organizing, storing, and retrieving the files and media contained in the library collection [1].

BUILDING A SUSTAINABLE DIGITAL LIBRARY

The use of computers in libraries has helped librarians to handle huge amount of information. Processing and storage of data have also become easier. This system of information will have infinite possibilities like:

- Storage oflarge quantity of information.
- Communication of large volume of information at high speed.
- Processing of information more rapidly and accurately.
- Rapid searching and retrieving of information stored in the computer system etc.

To build a sustainable digital library, the library has to provide sustainability to the following three categories of information:

- Digitally created/converted information
- Subscribeddigital information
- Library databases

These three ways help the libraries to stand true on the term of sustainable digital library. Providing back–up options of the information created and subscribed in digital form, and to the library database, which is a backbone for all library functions and services will help the librarian to build a sustainable digital library.

TECHNOLOGIES FOR THE SUSTAINABILITY OF THE DIGITAL LIBRARIES

The adoption of the following techniques will help the library to make its digital information to besustainable:

Sustainability for Digitally Created/Converted Information

Every institution will generate some kind of information while performing its academic activities likenewsletters, prospectus, magazines, question papers, classroom notes, photos and audiovisuals of various functions held at the institution, etc. The faculty, students and staff also create information as a part of research and their academic work like thesis, project reports, dissertation, patents, conference papers, journal articles, reference database etc.

If these sources of information aren't preserved, they will be lost in the ocean of information. Moreover if the already available information is not preserved; its absence will lead to the duplication of created information. Libraries can preserve these kinds of information sources by developing institutional repositories.

A digital collection maintained by the university or an academic institution to capture and preserve the intellectual output of its staff and faculty members is called an institutional repository. Libraries can upload the books, journal articles, theses, and other works for which the institution has the copyright. These institutional repositories are made available to the general public with few restrictions, in accordance with the goal of open access, in contrast to the publication of research in commercial journals, where the publishers offer limited access rights. There are many open access software (DSpace, Greenstone) and commercial software (VTLS-Vital) available to create institutional repositories[2].

Power Point Presentations (PPT)

Institutions usually organize various talks/seminars/conferences. The PowerPoint presentationsmade during these

events can be very useful sources of information as they will represent the large information in a gist form. The library can collect those kind of information sources from the organizers and can store them in library computers. The Library can create bibliographical databases for these and can make it accessible through OPAC (Open Public Access Catalogue). After finding out the required PPT, users can read them through library computers. Provision of rights related to the distribution of PPT can be decided by the library.

SUSTAINABILITY FOR SUBSCRIBED DIGITAL INFORMATION

The resources like online databases, journals, books, etc. subscribedby the libraryfrom various publishers may not be accessible after their discontinuation, if proper measures are not taken. Some kind of backup method has to be developed for these e-resources in order to keep them accessible in the future, even if they are discontinued. Following are the some of the ways to make such information sustainable:

By Paying Maintenance Fees

The publishers of the resources usually provide access to the content of subscribed period,underpayment of annual maintenance fees, if the library discontinuesthe subscribed resource. In this way the previously subscribed digital information of that period will remain accessible to the library users. The library should allocate sufficient amount separately for these kinds of expenses. By paying minimal annual maintenance fees they can save expenses on information storage and its sustainability, as the publisher will always maintain such backup for all their resources.

Maintaining Downloaded Information on Library Systems

The information downloaded by various scholars, faculty and students from various subscribed resources can be kept in any of the library system for future use with support of server. They (library users) can be asked to submit/mail those articles to the library. The library can arrange to preserve them in a classified way. The bibliographical databasefor such information has to be maintained with easy search strategies. In this way information will remain available in the future, though the access to the resources is discontinued.

Documents Received form Document Delivery Service

The information asked through document delivery services can be scanned and preserved for the future. This will not only help the library to grow its collection, but also saves the cost. A proper database has to be maintained by the library for easy retrieval of the bibliographical details of already requested and available information. The copyright issues and rules of the institutiondelivering the documents should be taken into consideration.

SUSTAINABILITY FOR LIBRARY DATABASE

Application of computers and utilization of computer based product and services in the performance of different library operations and functions in the provision of various services and production of output products can be termed as library automation[3]. Library housekeeping work, which includes acquisition, serial control, cataloguing, circulation, classifying the documents, maintaining various files for records, purchasing and subscribing the resources are now fully automated. As the data related to the functions and services of the library is in e-format, this information also requires sustainability. One can provide backup to library housekeeping information by using following ways:

Cloud Computing

Gartner Inc. (2012) defines it as "a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using internet technologies"[4]. Using this technology libraries can store their data onto a remote computer server for the future use. They can share this information with others through the internet. This service involves running of application software. Libraries can opt for cloud computing in two ways:

Cloud Computing, Storage for Service

In this library has to pay only for storage space used on the server. They can lease the server storage from vendors such as Microsoft, Google, etc. Using this storage space libraries are allowed to transfer their data from their local system to these rented spaces through the internet and can access as and when required.

Software Offering Cloud Computing for Service

Libraries can use software on rental provided by third party companies. Here libraries need not to install and run the software on library computers, can directly access the software through the internet. The major cloud capitalists include: sales force, IBM, Google, Dell, Microsoft, Yahoo etc. [5]. University maintaining various central libraries of its different institutions and departmental libraries can apply cloud computing to build a network among them. By establishing a public cloud it not only can conserve library resources, but also can improve its user satisfaction.

Figure 1: Cloud Computing (Source: *dreamstime.com*)

Grid Computing

Grid computing usually consists of one main computer that distributes information and tasks to a group of networked computers to accomplish a common goal [6]. Grid computing takes place in clusters of physical systems in a specific location. The data stored in grid computing may not be accessible remotely unless it has been given by any connected computer of the group. Libraries/institution has to maintain the main server of the grid. Library data will get submittedto the grid main system and will be accessible to all connected systems. Each different section workwill together getstored in the main computer. This way the information will always have the backup as the data will be in main systems which can be connected to a server rather than connecting all the library systems.

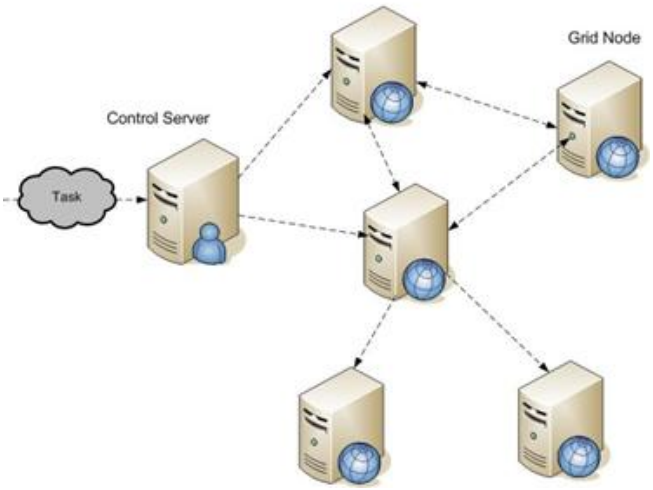

Figure 2: Grid Computing (Source: *epowerbilling.com*)

Parallel Computing

The use of software development activities in libraries is related to structured design of the application, to obtain software with better reliability, better performance and lower cost [7]. All these factors are most relevant when considering parallel computing machines with distributed memory.

In parallel computing system library computers involved in the various housekeeping work will have a common memory. This memory will be shared among all the systems and this will provide the library a common backup for all the stored information. In this service library need not take care of memory storage devices of each connectedcomputer. All the entered information can be protected by providing a server backup to a single memory.

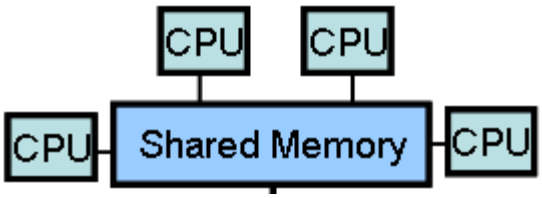

Figure 3: Parallel Computing (Source: *bioinfomagician.wordpress.com*)

CONCLUSIONS

Libraries are not only a knowledge reservoirs, their ultimate goal is to provide satisfactory services to all its users. Information sustainability always remainsa buzz word in the libraries. In this era of information technology, there are numerous optionsavailable for libraries to adopt in order to make their data and collection sustainable for the future generation. After judging the economical suitability and reliability of the service library can opt for the suitable source and a data sustainable system. The parallel computing or grid computing may be outdated when compared to cloud computing, but they are helpful for small and medium library's database for the sustainability of library housekeeping work. The locally created institutional repositories not only provide the preservation and sustainability to the created information, but also give the institution the chance of showcasing its work to the society. The subscription to online resources involves copyright rules and license agreements. The sustainability of these resources always remains crucial and paying an annual maintenance fee to the publishers remains a good option. Libraries need not worry about the server back-up and other

requirement to access the information from discontinued resources. After all sustainability of the digital libraries is the preservation of the digital information for the future generation.

ACKNOWLEDGEMENTS

Author is thankful to her student Mr. Sagender Singh Parmar who has assisted her in preparing this article.

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